BMC Medical Informatics and Decision Making

BioMed Central

Research article

Open Access

Computer and internet use by first year clinical and nursing students in a Nigerian teaching hospital

Grace Ada Ajuwon*

Address: E. Latunde Odeku Medical Library, College of Medicine, University of Ibadan, Nigeria

Email: Grace Ada Ajuwon* - agajuwon@yahoo.com

* Corresponding author

Published: 18 September 2003

BMC Medical Informatics and Decision Making 2003, **3**:10

Received: 05 April 2003

Accepted: 18 September 2003

This article is available from: http://www.biomedcentral.com/1472-6947/3/10

Abstract

Background: The internet is an important source of up-to-date medical information. Although several studies in different countries have explored the extent to which health science students use the computer and the internet, few researches are available on this subject in Nigeria. The aim of this study was to assess the uptake of computer and internet by health science students studying in the country.

Methods: One hundred and eighty three first year medical and nursing students of the University College Hospital, Ibadan, Nigeria, completed a-25 item questionnaire during routine Library Orientation Program in the medical library. The EPI-Info software was used for data analysis.

Results: The mean ages for medical students and the student nurses were 22 and 24.6 years respectively. Overall, 42.6% of the entire sample could use the computer, 57.4% could not. While more than half (58%) of the medical students are computer literate, majority (75.9%) of the student nurses are not. Slightly more than two thirds (60.7%) of the entire students had ever used the internet, 33. 9% had not. E-mail was the most popular of internet services used by the students (76.4%) and the cyber café was the common place where students had accessed these services. The students' mean scores on a 15-point perceived self-efficacy scale for internet-related tasks was 3.8 for medical and 0.7 for nursing students ($p = 0.00$). Students who are computer literate had superior mean scores (4.8) than those without (0.6) ($p = 0.000$).

Conclusion: First year clinical and nursing students in Ibadan Nigeria have not fully utilised the opportunity that the use of computer and internet offer for medical education. Improved efforts such as inclusion of computer education in medical and nursing curricular and establishment of computer laboratories are required to increase the student's access to computers and internet.

Background

Advances in telecommunication technology in the last two decades have led to the development of computer networks that allow access to vast amount of information and services [1]. Of the many computer networks that have been developed, the most prominent and widespread is the Internet, a global network of networks that enables computers of all kinds to directly and transparently communicate throughout the world. This 'global network of networks' has been described as the 'Information Super-highway' or 'Infobahn' because it constitutes a shared global resource of knowledge, and means of collaboration and co-operation in diverse communities [2]. It is an open and unregulated community of people who

communicate freely across an international electronic computer network [3]. It is simply the linking together of individual computers in a network [4]. The Internet was originally conceived by the United States of America's military in the sixties, as a means of ensuring a workable communication system in the event of a strike by enemy missiles or forces [5]. It has grown over the years to include academic and government computers as well as any one who owns a computer, a modem and an account with an Internet Service Provider. Although there is no precise statistics, it is estimated that there are at lest 100,000 networks, attached to more than 5 million computers located in over 100 countries, connected to the Internet. While access to the Internet was originally restricted to government departments, and organizations such as universities, in the 1990s it became available to those with access to a computer network, in both the developed and developing countries [6].

As in many other fields, the Internet is also present in medical domain. The development of the Internet, as a vehicle for World-wide communication, and the emergence of the World Wide Web, has made instantaneous access to much of the entire body of medical information an exciting one [7]. It is now one of the most important sources of information for students in institutions of higher learning throughout the world. It has also become a popular medium for delivering educational materials. The Internet has been used for medical education in diverse ways including teaching of organs, diagnosis of diseases, and conduct of medical examinations [8–13]. It is also being used as an important source of information for medical research [11]. Medical and nursing students who have participated in online education have stated that this mode of education has several advantages over traditional method of instruction. These advantages include the convenience of taking a course at a time that fitted students schedule and at a place that they did not have to commute to attend [14]. Online learning also assists students with the practical application of theoretical knowledge of some aspects of medicine such as cardiology [15].

Despite these advantages, online learning has certain limitations. For example, some students have complained of insufficient time and limited computer access [14]. Others claimed that this mode of instruction lack interactivity among students and between the students and the instructor that would be achieved in the ideal classroom setting [16]. Internet teleconferencing, however, appears to offer for real-time interactive classroom meeting on the Internet [16]. In addition, visual learners were more apt than audio learners to gain from online learning [16]. On-line learning has also been found to be consumer focused and many perceive online advertisement to be distracting [15]. Finally, the information available on the Internet can be overwhelming for students who lack the skills for verifying the quality of information available on-line [17].

While several researches have explored the extent to which health science students use Internet services in many countries, [8], [9] few of such studies are currently available in Nigeria. The aim of this study is to assess the level of computer and Internet use amongst first year Clinical students and students Nurses studying in Nigeria.

Methods

The setting

The University College Hospital (UCH), Ibadan, was established in 1957 and as such it is the oldest federal institution for tertiary health care, teaching and research in Nigeria The hospital has 45 medical specialty and subspecialties/disciplines and runs 75 consultative clinics weekly with 805 beds for admission. Apart from providing care, UCH is also a major training institution for diverse categories of health workers in the country. Through the University of Ibadan, UCH had trained over 5, 000 physicians and dentists and has produced approximately an equal number of scholarly publications of health-related researches. The hospital itself has trained more than 6, 000 nurses and midwives since inception and several hundred other health professionals including medical laboratory scientists, teachers of community health, environmental health, medical records and radiography. To date over 12 million patients have received care in the hospital [18].

The study population consists of medical students who are in their first year of clinical study and first year nursing students enrolled in UCH during 2001/2002 academic Session.

Recruitment procedures

The students were recruited into the study during the routine library orientation program organized by the author for all fresh student users of the Latunde Odeku Medical Library (LOML), which serves both students and faculty of the University of Ibadan and the UCH. The data were collected as part of efforts to assess the needs of students on use of computer and Internet, which is a component of the services provided at LOML. A questionnaire that consisted of 25 items was used for data collection. It elicited demographic profile, use of computer and internet-related resources. The questionnaire also assessed the students' perceived self-efficacy to perform five-internet-related tasks, including ability to download messages from the Internet, and search the Internet for classification of diseases. The questionnaire was pre-tested among a group of 20 students' library users, and was revised to enhance its clarity and comprehension. Verbal informed

Table 1: Demographic profiles of the students

Item	Student Nurses (N= 83)	Medical students (N = 100)	Total N= (183)
1. Age			
17–19	19 (22.9)	2 (2.0)	21 (11.5)
20–22	28 (33.7)	64 (64)	92 (50.3)
23–25	8 (9.6)	30 (30)	38 (20.8)
26–30	8 (9.6)	4 (4)	12 (6.6)
31–35	14 (16.9)	0	14 (7.6)
36 and above	6 (7.2)	0	6 (3.3)
Age range 17–45	Mean = 25; (+_6.782)	Mean = 22; (+_ 1.457)	
Sex			
Males	21 (25.3)	62 (62)	83 (45.4)
Females	62 (74.7)	38 (38)	100 (54.6)

* % are in brackets

consent was obtained from the students by disclosing that the data collected was for research purpose, that the questionnaire was anonymous, and that their participation in the study was voluntary.

All of the 100 clinical students and 83 student nurses who showed up for the orientation program agreed to participate in the study (response rate 100%). The questionnaires were self-administered and collected shortly before the orientation program commenced. The data were entered into the computer and analysis was done using the EPI-Info software developed by the Center for Disease Prevention and Control, Atlanta, Georgia, USA. The analysis is descriptive. The data on perceived level of confidence was summarized by assigning 3 points to those who are "very confident", 2 to those that have "little confident" and 1 to those who are "not confident at all". This was used to develop a 15 – perceived self-efficacy score.

Results

Demographic profile of students

The demographic profile of the students is described in Table 1. There are more female nurses (74.7 %) than males (25.3%); by contrast the medical students have more males (62%) than females (38%). The ages of the students ranged from 17–45 years; the mean age for student nurses is 24.6 years while that of medical students was 22 years.

Use of the computer

The students' ability and pattern of use of the computer is presented in Table 2. Overall, only 42.6% of the sample could use the computer, 57.4% could not. More than half (58%) of the medical students are computer literate, 75.9% of the student nurses are not. Majority (69.8%) of the student nurses who cannot use the computer claimed that they do not have access to a computer system. The 42% of the medical students who cannot do so said they do not have the time to learn how to use it. Among computer literate students, Microsoft Word was the most popular (66.2%) software ever used, followed by Word Perfect (25.6%).

Use of the internet

The students' use of Internet services and resources is shown in Table 3. Overall, 60.7% of the entire sample had used the Internet, 33.9% had not. However, more medical students (63%) than student nurses (12.5%) had used the Internet. Sixty five percent of the medical students claimed that they regularly obtained health-related information from the Internet as compared to 28.9% of the student nurses. The Email was the most popular of Internet services used by the students (76.4%), comprising of 81.3% medical and 73.4% student nurses. Forty-one percent of the 111 students who had ever used the Internet claimed that someone assisted them, 55.9% completed the task on their own. The Cyber café is the common place (87.3%) where students had accessed Internet services. Concerning search engines used, Yahoo is the most popular (89.1%), which was used by 93.8% student nurses and medical students (87.3%). Majority of the students, (67.5% student nurses and 72% medical students) have not searched a database before.

Perceived self-efficacy in performing internet-related tasks

The students were requested to determine the extent to which they perceived themselves confident in performing five Internet-related tasks. Their perceived ability to perform these tasks is shown in Table 4. A total of 86.2% of medical students were "very confident" to download materials from the Internet compared to 13.8% of student nurses. While 89.5 % of the medical students were "very

Table 2: Pattern of use of the computer by nursing and medical students

Item	Student Nurses (N = 83)	Medical students (N = 100)	Total (N = 183)
1. Computer literacy			
Yes	20 (24.1)	58 (58)	78 (42.6)
No	63 (75.9)	42 (42)	105 (57.4)
2. Reasons for Computer-illiteracy.			
a. I don't have the time	17 (27.0)	21 (50.0)	38 (36.2)
b. I have no access to a computer.	44 (69.8)	20 (47.6)	64 (61.0)
			2 (1.9)
c. I'm not interested	1 (1.6)		1 (0.9)
d. No response	1 (1.6)	1 (2.4)	
3. Types of programs used			
1. Word perfect	4 (20)	15 (26.0)	19 (25.6)
2. Microsoft word	11 (55)	38 (65.5)	49 (66.2)
3. MS DOS	1 (5)	2 (3.4)	3 (4.1)
4. Dbase	1 (5)	1 (1.7)	2 (2.7)
5. Corel Draw	1 (5)	2 (3.4)	1 (1.4)
6. Others	2 (10)	1 (1.7)	
4. Information sources use by Students.			
a. Textbooks	14 (16.9)	15 (15.0)	29 (15.9)
b. Journals	10 (12.0)	7 (7.0)	17 (8.3)
c. The Internet	24 (28.9)	65 (65.0)	89 (48.6)
d. MEDLINE on CD_ROM	14 (16.9)	1 (1.0)	15 (8.2)
e. No response	21 (25.3)	12 (12.0)	33 (18.0)

confident" in accessing information on Compact Disc Read Only Memory (CD-ROM), only 15.2 % of the student nurses are very confident in performing this task. Regarding ability to download an article from an online journal, 21.5% of medical students and 4.1% of nursing students were "very confident" to perform this task. Overall, the mean for the two groups was 3.8 and 0.7 for medical and nursing students respectively (p = 0.00). When the level of confidence scores was compared with gender it was found that overall males significantly had superior mean scores (3.4) than females (1.6) (p = 0.004). Students who are computer literate also had superior mean scores than those who are not (4.8 vs. 0.6) (p = 0.000). Those who had ever used the Internet also had higher mean scores than those who had not (3.6 vs. 0.5) (p = 0.000).

Discussion

There have been rapid advances in communication and information technology, in the past few years and the pervasion of the World Wide Web into everyday life has important implications for medical education [17]. The use of the computer and the Internet technology by health science students will result in more effective medical education, including teaching, medical examination, and diagnosis of disease [9]. However, these gains will only occur when students have increased access to this technology. In this study, only 43% of the sample could use the computer. This figure is lower than the 84% of undergraduate students in Glasgow, United Kingdom (UK) [8], 94% of medical students from Jeddah, Saudi Arabia [9] and 95% undergraduate dental students in Oulu, Finland [10]. Similar studies have found higher proportion of students had used the computer: 61 % medical students from Malaysia [19], 80% final year medical students from Lagos, Nigeria [11]. The relatively lower proportion of those who could use the computer in this study may be a reflection of a limited access to computers among first year health sciences students in Nigeria. The relatively high cost of this product within the country is one of the primary reasons for this situation. Increased funding to Universities by government and Non-Governmental Agencies (NGA) is likely to solve this problem. This would enable Nigerian universities to set-up computer laboratories in various faculties where students can

Table 3: Patterns of use of Internet services by students

Item	Student Nurses (N = 83) No %	Medical students (N = 100 No %	Total (N = 183)
Ever used the Internet?			
Yes	32 (38.6)	79 (79)	111 (60.7)
No	41 (49.4)	21 (21)	62 (33.9)
No response	10 (12.0)	0	10 (5.5)
Frequency of Internet use.			
1. Most frequently			
2. Regularly	4 (12.5)	5 (6.3)	9 (8.1)
3. Occasionally	7 (21.9)	29 (36.7)	36 (32.4)
4. Rarely	15 (46.9)	27 (34.2)	42 (37.8)
	6 (18.8)	18 (22.8)	24 (21.6)
2. Internet services used by students			
a. E-mail	26 (81.3)	58 (73.4)	84 (75.7)
b. Web browsing	2 (12.5)	21 (26.6)	25 (22.5)
c. Games	1 (3.1)	0	1 (0.9)
d. Others (movies)	1 (3.1)	0	1 (0.9)
3. Mode of Internet use			
a. Assisted	18 (59.4)	30 (30.0)	49 (44.1)
b. Not Assisted	13 (40.6)	49 (62.0)	62 (55.8)
4. Where Internet service was Used.			
a. Cyber café	28 (87.5)	69 (87.3)	97 (87.4)
b. Home	0	9 (11.4)	9 (8.1)
c. Library	1 (3.1)	0	1 (0.9)
d. A friend's house	3 (9.4)	1 (1.3)	4 (3.6)
5. Search engines used			
a. Yahoo	30 (93.8)	69 (87.3)	99 (89.2)
b. Google	1 (3.1)	9 (11.4)	10 (9.0)
c. Alta Vista	1 (3.1)	0	1 (0.9)
d. Ask Jeeves		1 (1.3)	1 (0.9)

have full access to Internet services as it is done in other countries including America [20].

Although 43% of the entire sample in this study was computer literate, a larger majority (61%) had used the Internet. This figure is comparable to the findings from similar studies. In Malaysia, 67% of Medical students surveyed reported adequate skills in browsing the Internet 78% in using the e-mail [19]. Similarly, in Lagos, Nigeria, the Internet and e-mail were used by 58% of medical students [11] and 53% dental students in the UK [21]. The difference between level of computer literacy and use of Internet services found in this study could be explained by the fact that the majority of those who used the Internet were assisted in doing so.

More medical students, than student nurses had used both the computer and the Internet. In addition, more medical students than student nurses regularly obtained health-related information from the Internet. Similar findings have been reported in Glasgow where more medical students than nursing students had used the computer and the Internet [8]. Other investigators have reported similar findings [8], [9]. In this survey, medical students may have had greater appreciation of the relevance of the Internet to their education since they have spent some part of their undergraduate years on the main campus of the University of Ibadan. Thus, many of them may have come to see the Internet as a valued source of information for their training. On the other hand, majority of the student nurses may not have had the opportunity to use the Internet since they have just recently left secondary school

Table 4: Perceived confidence in performing Internet related tasks by the students

	Student Nurses (N = 83)			Medical students (N = 100)		
Tasks	Not Confident	Little confident	Very confident	Not confident	Little confident	Very Confident
Download free medical books from the internet	71.2 %	21.2 %	7.7 %	31.7 %	37.8 %	30.5 %
Search the Internet for classification of diseases.	67.3 %	23.1 %	9.6 %	32.9 %	28.0%	39.0 %
Search the Internet for a list of health sciences libraries in Africa	69.8 %	24.5 %	5.7 %	31.7 %	37.8 %	30.5 %
Access information on CD-ROM	74.0 %	16.0 %	10.0 %	31.6 %	31.6 %	36.8 %
Retrieve and download full-textarticle from an online journal (BMJ)	79.6 %	16.3 %	4.1 %	44.3 %	34.2 %	21.5 %

for the school of nursing. It is also possible that the importance of the Internet has not been emphasized in their previous and present education.

E-mail was the most popular of the Internet services used by the students. This is comparable to previous studies where e-mail use was high (78%) among medical students in Malaysia [20]. E-mail is the fastest and cheapest means of electronic communication in the world today. Access to this service has increased in recent years in Nigeria due to the proliferation of cyber cafes in many towns and cities, which in turn has reduced the cost of this service. However, access to e-mail services is not readily available to many people living in rural areas of the country.

Program implications

The data from this survey has provided baseline information for making appropriate recommendations. Four interventions are recommended to address the problem of low utilization of the computer and Internet by health science students in Ibadan, Nigeria. First, government, NGA and interested philanthropists need to provide funding assistance to enable universities in Nigeria purchase computers linked with Internet facilities to improve students' access to the resources available on-line. Secondly, providing direct loan to students is another potentially feasible intervention that would enable them purchase personal computers. In this regard, the buddy system can be encouraged in which students who own computers could in turn assist others to learn how to use the computer and the Internet. Thirdly, the faculty has important role to play in improving students' access to use of computer and Internet services. For example, the faculty may encourage students to use Internet services by creating web pages that students can visit as part of their learning. Finally, students' interest to use the computer would be kindled if an introductory course on computer use were included into existing medical and nursing curricular in the universities and teaching hospitals in the country.

The findings of this study particularly the system of learning to use the computer and Internet from friends and colleagues needs further investigation.

Conclusions

The use of the computer and Internet is rapidly becoming a key component of medical education in many parts of the world. Although the Internet is an important source of medical information, first year medical and nursing students in Ibadan, Nigeria, have not fully utilized these facilities. Increased funding, introduction of computer education into existing medical and nursing curricular would enhance students' ability to acquire, appraise, and use information from the Internet to solve health problems quickly and efficiently during training and practice.

List of abbreviations

- ELOML (E. Latunde Odeku Medical Library)
- UCH (University College Hospital)
- LOP (Library Orientation Program)
- Non-Governmental Agencies

Competing interests

none declared.

Authors' contributions

GA is the sole contributor to this manuscript.

Acknowledgements

I thank all the students who participated in this study.

References

1. Glowniak JV: **Medical resources on the internet.** *Ann Intern Med* 1995, **123(3):**123-131.
2. The Internet Society: **What is the Internet?** 2002 [http://www.isoc.org/internet/].
3. Coiera E: **Medical informatics.** *BMJ* 1995, **310:**1381-1386.
4. Mckenzie BC: **Medicine and the internet: introducing on-line resources and terminology.** *New-York, Oxford University Press* 1997:97.
5. December J and Randall N: **The world wide web unleashed.** *Indianapolis, Sams Publishers* 1994:6.
6. Millman A, Lee N and Kealy K: **ABC of the Medical Computing Internet.** *BMJ* 1995, **311:**440.
7. **Bio informatics: searching the net.** *Serm Nucl Med* 1998, **28:**177-187.
8. Jones RB, Navin LM, Barrie J, Hillan E and Kinane D: **Computer literacy among medical, nursing, dental and veterinary undergraduates.** *Med Educ* 1991, **25:**191-195.
9. Mansor I: **Computer skills among medical students: a survey at the King Abdul Aziz University, Jeddah.** *J Ayub Med Coll* 2002, **14(3):**13-15.
10. Mattheos N, Nattestad A, Schittek M and Attstrom R: **Computer literacy and attitudes among students in 16 European dental schools: current aspects, regional differences and future trends.** *Eur J Dent Edu* 2002, **6(1):**30-35.
11. Virtanen JI and Nieminen P: **Information and communication technology among undergraduate dental students in Finland.** *Eur J Dent Edu* 2002, **6(1):**147-152.
12. Odusanya OO and Bamgbala O: **Computing and information technology skills of final year medical and dental students at the College of Medicine, University of Lagos, Nigeria.** *Niger Post grad Med J* 2002, **9(4):**189-193.
13. Atack L and Rankin J: **A descriptive study of registered nurses experiences with web-based learning.** *J Adv Nurs* 2002, **40(4):**315-319.
14. Hong CH, Mclean D, Shapiro J and Lui H: **Using the internet to assess and teach medical students in dermatology.** *J Cutan Med Surg* 2002, **6(4):**315-319.
15. Grimes EB: **Student's perceptions of an online dental terminology course.** *J Dent Edu* 2002, **66(1):**100-107.
16. Hayward LM and Cairns MA: **Allied health students' perceptions of and experiences with internet-based study instruction.** *J Allied Health* 2002, **30(4):**232-238.
17. Sear AM and Douglass DB: **Use of internet for real-time instruction in a graduate health services administration program.** *J Health Adm Edu* 1998, **16(4):**425-427.
18. Ward JPT, Gordon J, Field MJ and Lehmann HP: **Communication and information technology in medical education.** *Lancet* 2001, **357:**792-796.
19. **University College Hospital Hand Diary.** 2002.
20. Nurjahan MI, Lim TA, Yeong SW, Foong AL and Ware J: **Utilization of information technology in medical education: a questionnaire survey of students in a Malaysian institution.** *Med J Malaysia* 2002, **57(suppl E):**58-66.
21. **Johns Hopkins Bloomberg School of Public Health Students handbook, 2002–2003.** *Johns Hopkins Press* .
22. Walmsley AD, White DA, Eynon R and Somerfield L: **The use of the Internet within a dental school.** *Eur J Dent Edu* 2003, **1(1):**27-33.

Pre-publication history

The pre-publication history for this paper can be accessed here:

http://www.biomedcentral.com/1472-6947/3/10/prepub